DS3 R3

CITROËN RACING

System User Guide

Sport e-motion

Rel 1.0 --- 28/03/2011

MOTORSPORT

MAGNETI MARELLI

SRT DS3R3 System User Guide

28/03/2011

SUMMARY

-Global System Overview
- Loom
- Acquisition signals

-Driver System Overview:
- Functions Overview
- Steering wheel management
- Dash Board Overview
- Gearbox management
- Hydraulic System
- Accessory Management
- Start Assistance System
- Calibration
- Diagnostic

- Telemetry (Wintax)
-Install
-Settings

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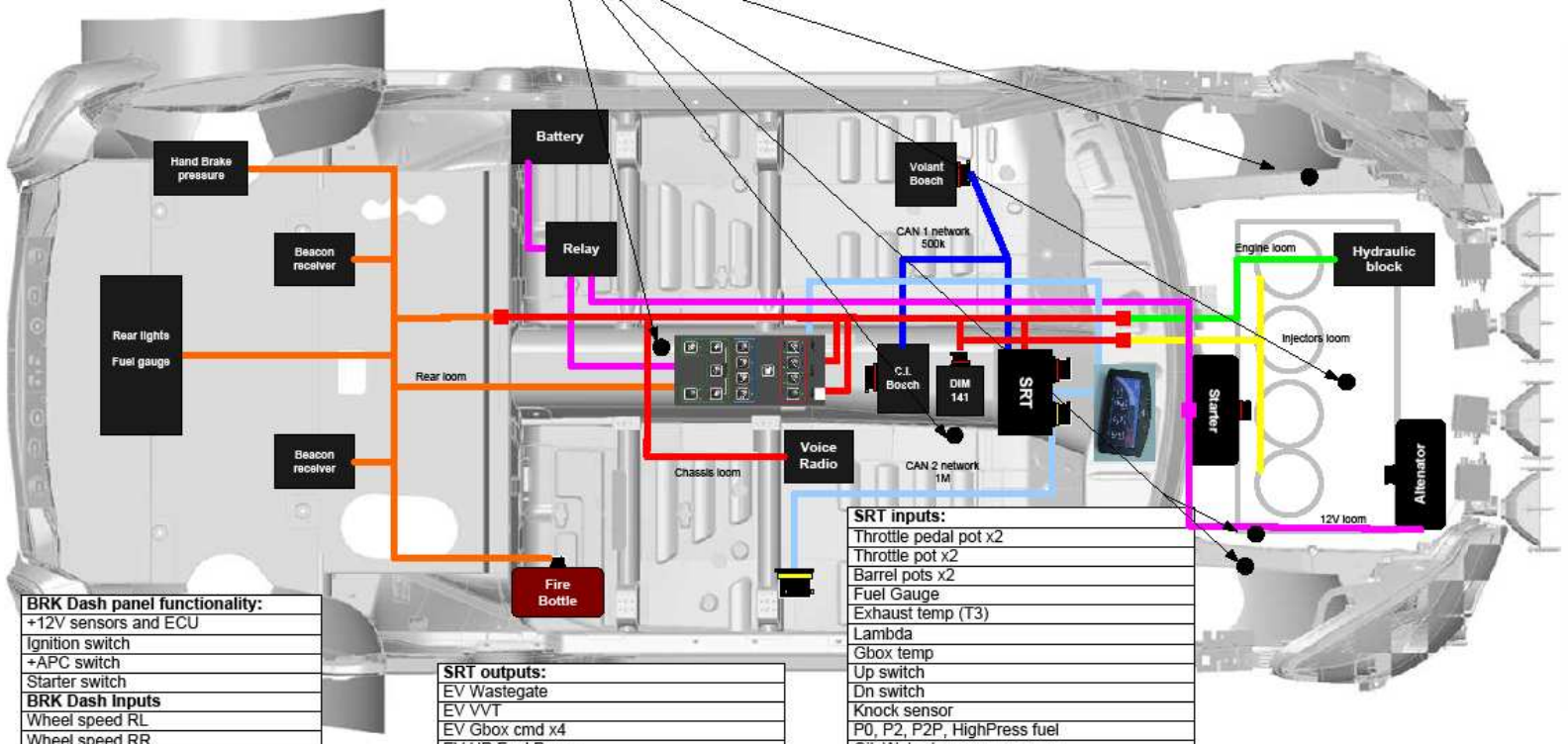
Global System Overview ---Loom---



DDU inputs:
Brake Pressures:
Front, Rear & Hand
Hydraulic pressure
Hydr Accu pressure
T0 temperature
Lock Shift button

BRK Dash panel functionality:
+12V sensors and ECU
Ignition switch
+APC switch
Starter switch
BRK Dash Inputs
Wheel speed RL
Wheel speed RR
Wheel speed FL
Wheel speed FR

SRT outputs:
EV Wastegate
EV VVT
EV Gbox cmd x4
EV HP Fuel Pump
Inj command through DIM
Ign command
5V power

SRT inputs:
Throttle pedal pot x2
Throttle pot x2
Barrel pots x2
Fuel Gauge
Exhaust temp (T3)
Lambda
Gbox temp
Up switch
Dn switch
Knock sensor
P0, P2, P2P, HighPress fuel
Oil, Water temp
Oil, Water Press
T2 temp

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Acquisition System Overview

Analog and frequency signals

Those channels dedicated to engine or chassis are part of basic system. The processing done on them will be realized by the ECU (calibration, diagnosis,…)

- Engine oil pressure
- Engine water pressure
- Engine intake pressure
- Engine turbocharger pressure
- Atmospheric pressure
- Barrel position
- Pedal position(%)
- Throttle position(°)
- Clutch pressure
- Hydraulic pressure
- Wheels speed
- Brake pressures
- Knock sensor

Signals from Bosch modules

Those channels dedicated to chassis care are part of basis system. The processing done on them will be realized by the Bosch unit (calibration, diagnosis,…)

- XY accelerometer
- Steering angle
- Yaw

Signals from BRK

Those channels dedicated to chassis care are part of basis system. The processing done on them will be realized by the BRK unit (calibration, diagnosis,…)

- Front Wheel speeds x2
- Rear Wheel speeds x2
- A specific signal will be sent to Coralba

Temperature Processed signals

Four measurement of temperature are acquired by ECU (Water Temp, Air Temp, Oil Temp, Gbox Temp and Box Temp). Those measurements are done through CTN temperature sensor ,specific type, therefore all the settings done into the software are adapted to them. The use of a sensor other than the one specified can raise some doubts on the entire system, anyway against the original setup.

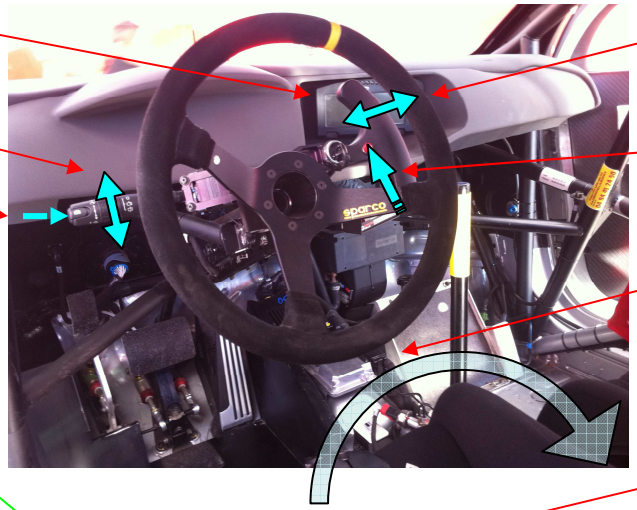
Acquisition System Overview

Mandatory Sensors

Those sensors are used by the system, NOT having those working properly will generated problems to system and parts :

- Engine intake pressure(P2)
- Engine turbocharger pressure (P2P)
- Barrel position
- Pedal position(%)
- Throttle position(°)
- Clutch pressure (Pemb)
- Hydraulic pressure (Accu and Block)
- Wheel speed
- Hand Brake pressure (P_FRMA)
- Engine water temperature (T_EAU)
- Exhaust temperature (T3)
- Intake temperature (T2)
- Atmospheric pressure(P0)
- Knock sensor

Functions Overview



Dashboad display

Wiper speed

Low/high beam // Flash

Auxiliary lights select

Nb: Corner lamp has to be selected to use Fog lights at least.

Nb: High beam has to be selected to use inlet&outlet lights

Headlights

First press => cornering lamp

2nd press => Low beam

3rd press => switch off lights

Turn lights // both selected => hazards

One press => 20s (10 flashes)

Heater // Engine fans Test // Steering angle

Gear shift paddle

Pull => Up

Push=> Down

Gear shift lock (R↔N↔1)

ECUs

Starter --- +APC --- Main switches

Strategy mode (go to next page for details)

Hydraulic bleed button

swap pages button

One press => swap pages

Hold press => swap standard/Mechanic

Horn

Aux Power (Not used) // fuel drain out // Steering angle

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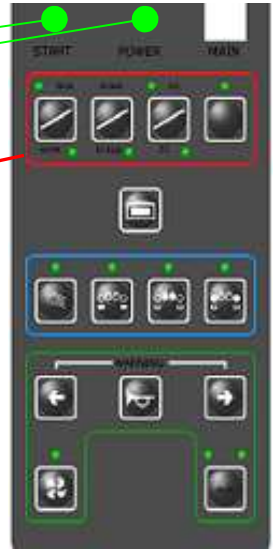
Driver System Overview

Steering wheels input signals

- **Up and Down request**
  - Access from the rear of the steering wheel with right paddle
  - Push to Down
  - Pull to Up
- **Neutral request**
  - Active by pushing locking button and Up or Down request
  - Disable over 30km/h and gear > 1
- **Reverse request**
  - Active by pushing locking button and Down request
  - Disable over 10km/h and/or 2000rpm
  - Reverse disengaged by Neutral request.
- **Engine Crank**
  - Active if DIM141 is not connected by pressing 'start' button
- **Kill Engine**
  - Active if APC is switched OFF
- **Vehicle Maps**
  - Few Vehicle maps will be available on the center panel in STAGE mode only:
    - Asphalt w/ S0 or S1
    - Asphalt w/ S2
    - Gravel w/ S0 or S1
    - Gravel w/ S2
- **Start (S button)**
  - Activated if CAR is stopped
  - S1 or S2 is selected
  - Road then Stage Mode is activated



	ASPHALTE	GRAVEL
S0	Full power	Full power Liftoff control reduced (1→2)
S1	S0 + SAS (std grip)	S0 + SAS (heavy grip)
S2	S1 + torque reduced Liftoff control reduced (1→2) SAS (low grip)	S1 + low torque Liftoff control OFF SAS (very low grip)

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Driver System Overview

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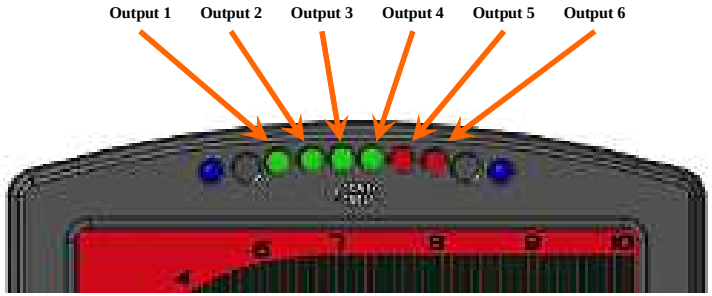

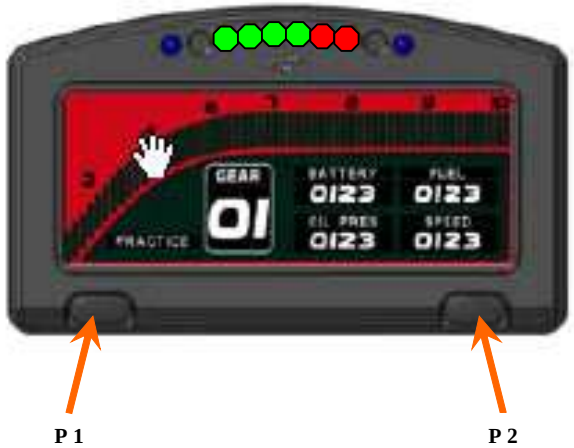

Dashboard information

- **Rev information**
  - Out 1 to 4, Engine's approaching up shift rev
  - Lighted 2 by 2
  - Out 5 => time to shift
  - Out 6 => Over Rev
- **Mode and Alarm information**
  - Led 1
    - Blinking => Not used
    - Freeze => Information
  - Led 2
    - Blinking => Alarm
    - Freeze => Alarm Low level
  - Both
    - Blinking => Start engaged or Alarm High Level
    - Freeze => Not Used
- **Dashboard buttons**
  - P1
    - Zeroing fuel consumption
  - P2
    - Scroll pages

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GearBox System Overview

Switches Up and Down

An up/down demand is activated following a short bandwidth voltage detection, from one to the other (total bandwidth:0 to 5V). The goal of this strategy is to avoid any electrical interference from the steering wheel that can be considered valid (shortcut, etc)

The demand is considered from both inputs if:

- -Electrical diagnosis are OK (no value closed to 0 or 5 volts)
- -Gearbox automate at Idle state.
- -No hydraulic pressure measurement fault.
- -No barrel position measurement fault (F on dash).
- -No overrev expected (downshift only), request will be saved (only one) and realized when possible.
- -No torque requested on downshift from driver.
- -500ms at least between UP requests
- -200ms alt least between DOWN requests

Hydraulic pressure

Beside the electrical diagnosis done (Invalid if the voltage value is out of thresholds set), this measurement shows the pressure available into the main circuit. This sensor is fundamental to be able to keep a eye on and make sure the pressure is there. This is part of the pump management.
In case of Hydraulic pressure drops under 30b, the pump and gearshifts change will be stopped.
The system is based on the accumulator pressure signal. In case of failure, the system will automatically swapped to the Hydraulic Block pressure signal.
If both are faulty, then the pump will not be driven anymore and the gearshift will be stopped.

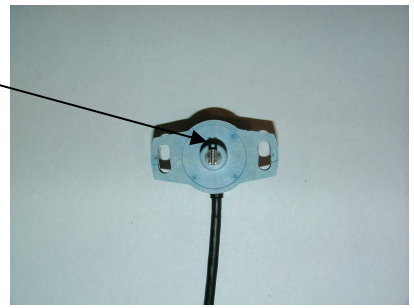
Gearbox System Overview

Barrel position

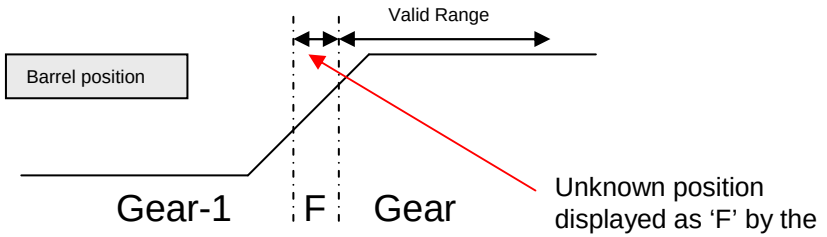
Beside the electrical diagnosis done (Invalid if the voltage value is out of thresholds set), the gearbox automate is based on this measurement, indeed from the barrel position regulation, all the gear changes will depend on (engaged, disengaged).
Therefore, the way to set it correctly (if you have to remove the sensor) will be as follow:
Connect the sensor, make sure that the gearbox is mechanically in neutral, positioned the sensor by checking the current barrel value on the dashboard (first mechanic page), which has to be 1000mV ±5mV.

A mark is on the side, which should be set up **upper**

Upside down display '4' instead of '0'



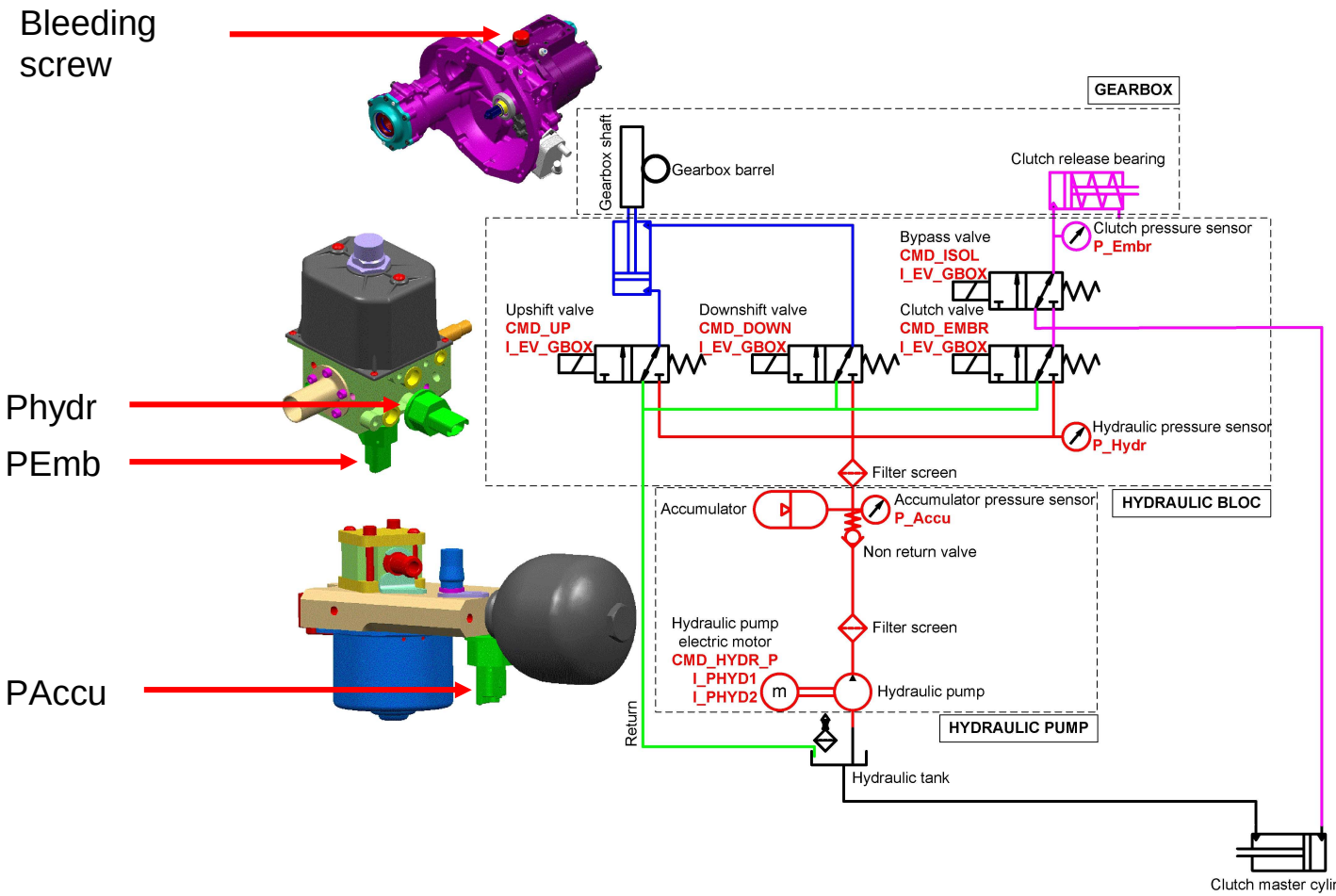
Few time in this document, "Neutral position of the gearbox" idea has been raised. You must know that if you do not pay enough attention to potentiometer calibration, the quality of the entire gearshift system will be modified, as the mileage.



Unknown position displayed as 'F' by the system

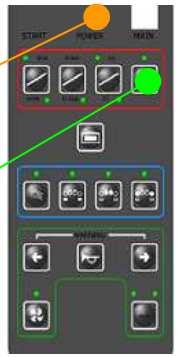
If the system detected an unknown position for more than couple of seconds, then the default gear **"5"** will be displayed.
Then driver will be allowed to downshift or upshift depending on the situation.

Hydraulic System Overview



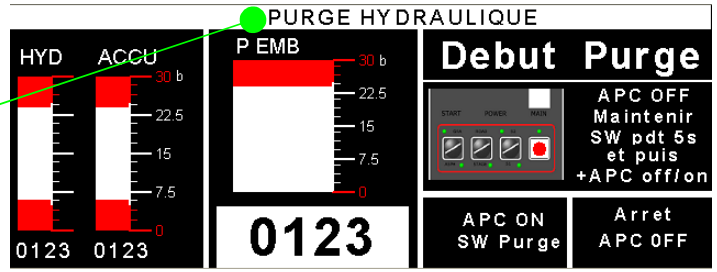
Hydraulic system bleed

Nb: Please be aware that there are two hydraulic networks, one linked to clutch pedal ‘Standard’ and a second controlled by ECU ‘System’. Check schematic for further details…



- **MUST BE DONE IF**
  - **Brand new parts mounted**
  - **High pressure network has been opened**
    - **Pump, Block, Pipes**
- **BEFORE**
  - **the standard clutch bleed (thru pedal) has to be done.**
- **PROCESS**
  - **Check tank is full**
  - **Open the bleed screw w/ pipe and catch tank as a standard clutch bleed**
  - **CAR Main SW ON**
  - **Switch APC OFF**
  - **Don’t push on Clutch pedal!!!**
  - **Press on unlabeled switch during 5s then switch APC ON**
  - **That page will appear if it is not already displayed**
  - **The system will open the valves and start running the pump**
- **WILL STOP AFTER:**
  - **10s**
  - **APC is switch OFF**
  - **If 40b is reached, meaning the bleeding screw has been closed.**
- **MUST DO:**

A complete reset (APC then Main) to go back to standard hydraulic management.



Accessory management Overview

Hydraulic pump

- Nominal value is ~50bars
- Electrical pump driven by ECU
- At power up, driven until 53 bars is reached, message 1 will appear on screen
- If Pressure under 47bars, pump ON until 53bars is reached
- If pressure under 20bars during more than 3s , pump is not driven anymore (avoid damage from the loom, pump, etc…)
- If Accu pressure sensor failed => swap to Hydraulic pressure sensor
- For FIA reg, after 3s than APC is OFF, hydraulic pressure is released. Message 2 will appear on screen
  - Nb: if +APC is back ON before or Main is switched OFF, this will not be done

Fuel Pump

- ON at power up during few seconds
- ON if Engine ON
- Can be forced (to pump fuel out of the tank), APC OFF keep pushing AUX button while APC is switched ON

Water Cooling Fans

- Both ON if Water temperature>80° then OFF <75°
- Can be forced, APC OFF keep pushing Fan button while APC is switched ON.
- OFF in any case if the engine is stalled excepted in STAGE mode.

Turbo Temperature

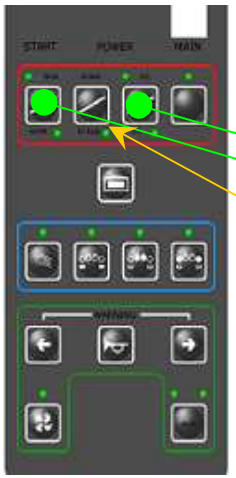
- If T3>950° C Bang Bang is OFF
- Entry BangBang temperature <920° C
- When Car is stationnary, Gearbox in Neutral and Road Mode activated Message 3 appears on screen if the temperature is too high to switch the engine OFF.

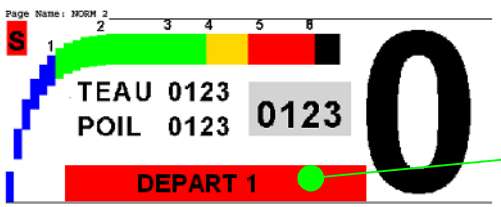
Mess 1

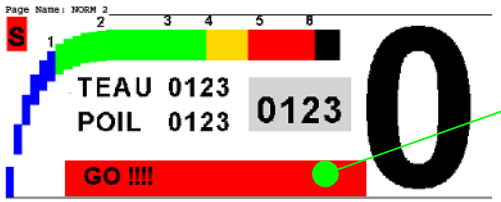
Mess 2

Mess 3

Start Assistance System -SAS-







➢**Definition**

Different setups have been programmed as follow:

- ➢S0 is defined as SAS OFF
- ➢S1 is defined as SAS ON with standard grip depending on type of surface chosen
- ➢S2 is defined as SAS ON low grip depending on type of surface chosen

➢**SCS activation**

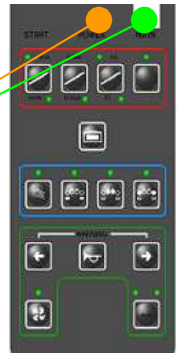
- ➢Select Type of start control wanted
- ➢Select Type of surface wanted

Then

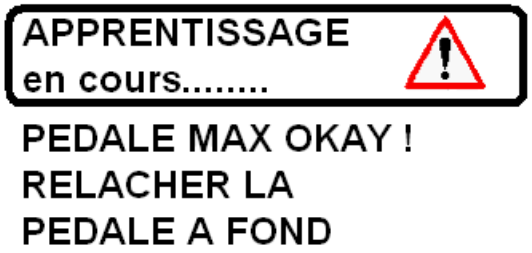
- ➢Vehicle stationary
- ➢Road Mode
- ➢First gear
- ➢Clutch pedal pressed
- ➢hand braking over 10b then
- ➢Select Stage Mode to activate the strategy
  - ➢a message will appear on the dash
- ➢Push Full throttle to “load” turbo, it takes about 3s.
- ➢When reached, GO !!!! message appears
  - ➢Turbo is loaded, go whenever.
- ➢Driver is advised to release Hand Brake pressure then clutch pedal and to maintain full throttle

➢When the Start is done, the entire process need to be done again to be able to do another one.

Pedal/throttle calibration Overview



- BEFORE
  - Engine Stopped
  - Gearbox in Neutral
- PROCESS
  - CAR Main SW OFF
  - Switch APC ON
  - Push full throttle
  - Then switch Main Switch ON
  - Stay that way until a message appears on Dash
  - Follow instructions
  - If no action is seen after few seconds, process is aborted
- MUST BE DONE AFTER:
  - Throttle or pedal changed
  - Engine changed
  - ECU changed
  - A full map has been uploaded by Citroën Personnel



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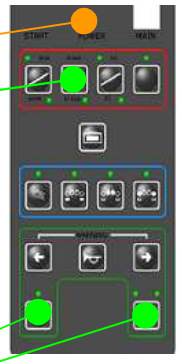
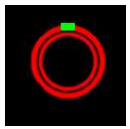
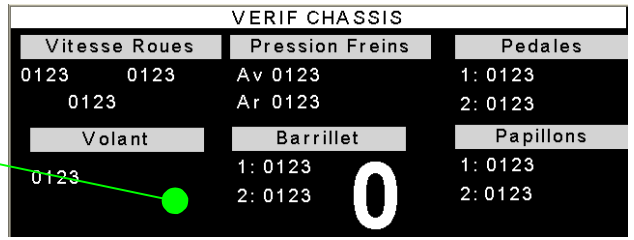
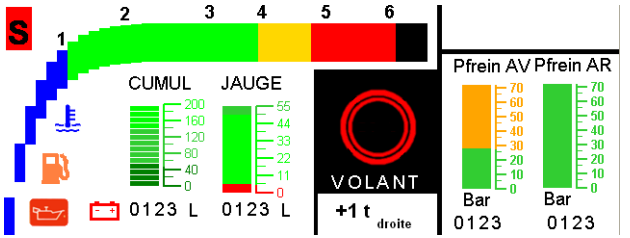
Steering Angle calibration Overview

- BEFORE
  - Engine Stopped
  - Gearbox in Neutral
  - APC OFF
  - Road mode ON
  - Make sure the wheels are straight (with zero pipe on)
  - Switch to “Verification Chassis” mech page
- PROCESS
  - Hold Steering wheel with straight line tool.
  - Press on Fan and Aux sw at the same time during 5s
  - OK green should appeared
  - Accuracy can be checked on driver checking page
    - Green tab appears when angle ±1°
- MUST BE DONE AFTER:
  - Bosch steering angle module changed
  - ECU changed
  - Any work on steering system









Diagnostics Overview

- CLUTCH WARNING
  - Appear on Road and Stage pages only
  - Appear if clutch pressure is not enough to change gears properly.
  - Driver is advised to use Clutch pedal to change gears

- ENGINE WARNING --
  - Ignition plug not connected:
    - This icon will appear in Mechanic Diagnostic page with the cylinder number.
  - Synchronization information
    - In case of lost synchronization, those icons will appear into Mechanic Diagnostic page with a name related to it
    - In case of weird behavior of crank signal
      - Rpm=0 and start button activated, a alarm will be raised

- OUTPUTS WARNING
  - In case of current protection, an alarm will be raised.
  - Then before any power cycle, go to Mechanic Diagnostic page to check what has been switched off

Bosch element

Stop light

Rear lights

Reverse light

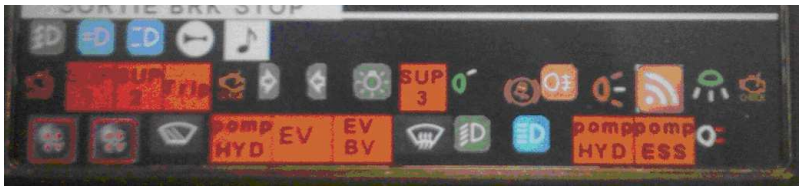
Radio

Wiper

crank or cam and Lambda

Map light

Lap Marker



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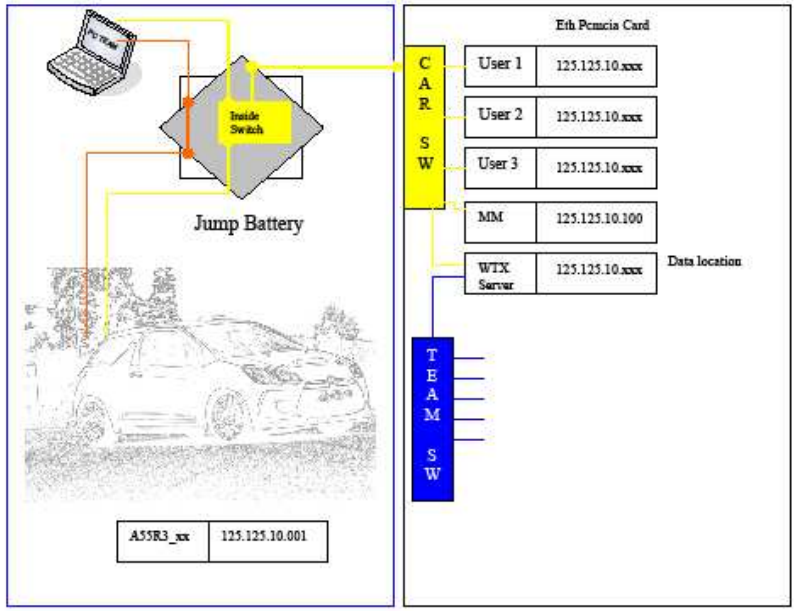
Telemetry Overview

CHARBONNEAU David
2010/04/02

--A55R3 Network 2010--
SRT-E System

PROPOSAL



Information :

- USER laptop can look for data directly thru an additive ethernet PCMCIA card (defined IP address) => CAR NETWORK
IP 125.125.10.xxx
Mask 255.255.0.0

- The person responsible of data download (MM engineer for example) will do a "copy to host" into server laptop.

-.Server laptop will have two Ethernet cards activated, so it can be accessed from two different networks.

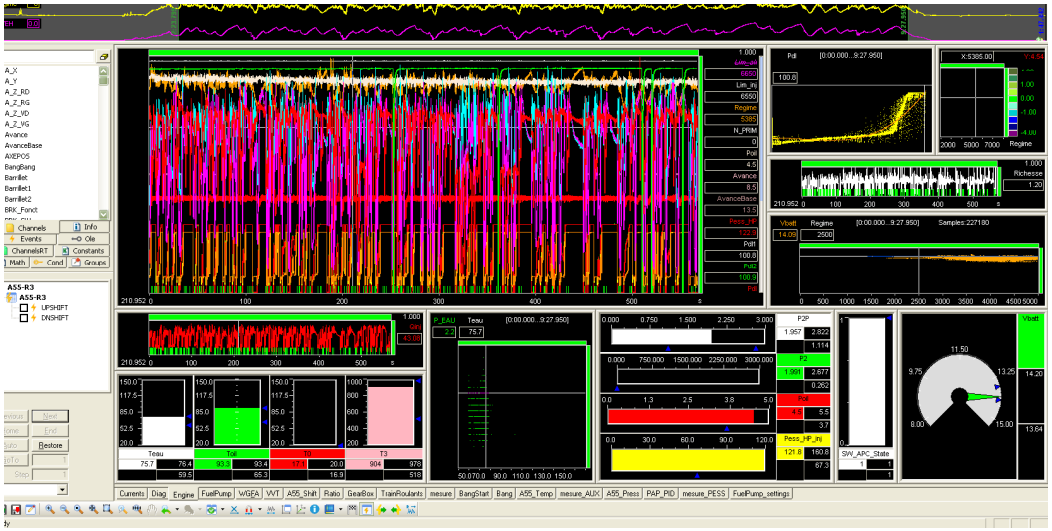
-In Yellow:	CAR Network
In Blue	Team Network
-In orange:	CAN Network

WINTAX4

WINTAX 4 is the Magneti Marelli data analysis SW tool.

It is certainly one of the best Motorsport data analysis PC tools, adopted in F1, Moto GP, WRC, Le Mans Series and many other racing competitions.

For an overview of WTX4 please refer to specific documents or to its embedded Help On Line.



DS3R3 is set with 8Mo of space disk which will allow about 30mn of logging datas.

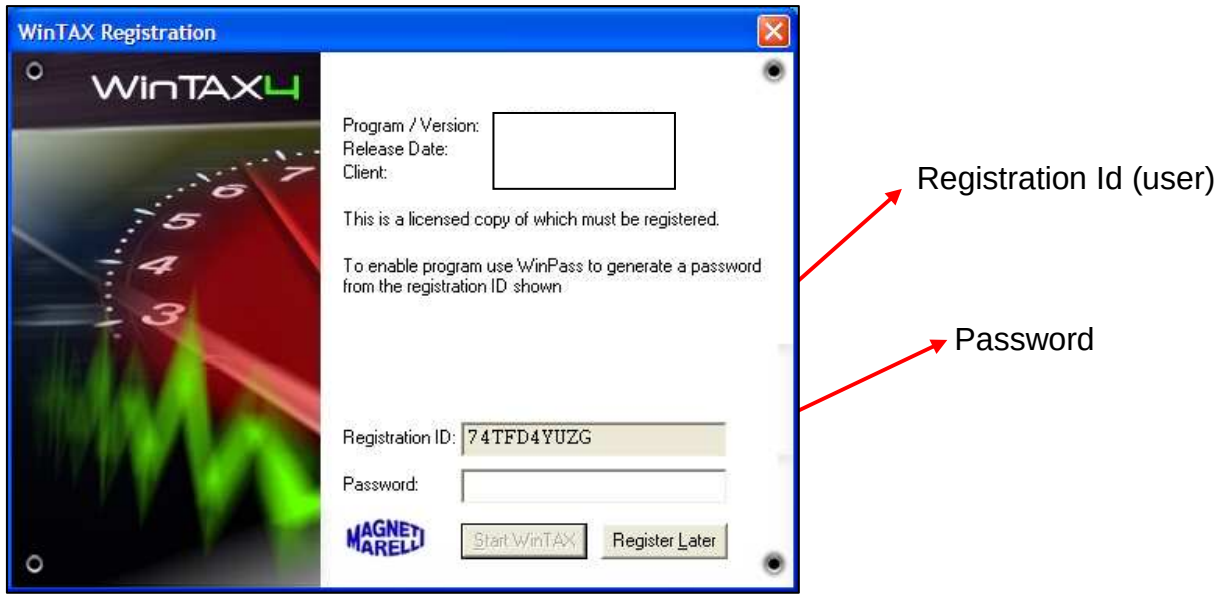
This can be extended up to 3hours with the 64Mo kit (Optionnal)

WINTAX4 INSTALL & SETUP

When installing a latest version of WINTAX4 double clicking the Setup.exe file, the user is required to just overwrite the previous version or completely remove it.

Please note that at the first WTX4 installation on a PC it is required a password to enable the application.

This password will be released by CITROEN only.



WINTAX4 TEAM - DATA ANALYSIS

- A set of channels defined by CITROEN will be available to the teams for data analysis

- To save disk space, data frequencies will be different between Road and Stage.
- Start logging data with APC ON.

- Possibility to add gain and offset to channels in Wintax

Wintax-Set IP

- First of you need to set your ethernet port with the following IP address:
  - IP: 125.125.10.xxx
  - Mask: 255.255.0.0

  Please follow instructions in the file:

- Double click on the file on the side =>

Ethernet download interface

To download data via cable, connect the PC directly to the data logger using a standard Ethernet network adapter. For instructions about the interface adapter installation please refer to the instructions supplied with the hardware.

Configure the PC with a fixed IP address

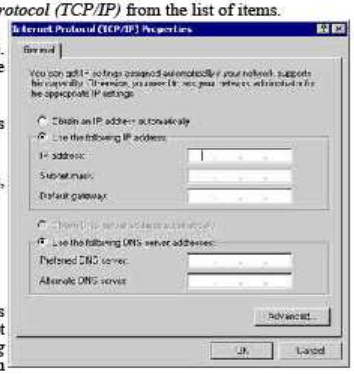
(Instructions for Windows 2000/XP) The data logger is programmed with a fixed IP address. Unless the network is set up to assign the correct address to the PC via DHCP, define a fixed IP address for the PC to allow the two devices to communicate

1. Connect the PC to the data logger via Ethernet link. From the start menu select *Start/Settings/Control Panel* and double click on the *Network* icon .
2. Right click on the Network connection to be used to download (more than one may be available).

Network and Dial-up Connections
File Edit View Favorites Tools Advanced
Back Search Folders
Address Network and Dial-up Connections
Make New Connection
Local Area Connection
Local Area Connection 3

3. Click on *Properties* and then select *Internet Protocol (TCP/IP)* from the list of items.
4. Take note of the settings found here. Reconfigure them later when the PC has to be connected back to the network.
5. Choose an IP address on the same subnet as the data logger.
6. Configure the IP address of the PC as follows, e.g. :

   IP address: 192.168.1.xxx
   Subnet mask: 255.255.255.0
   Default gateway: none
7. To check if the IP address change was successful, use the DOS command prompt (*Start/Run/cmd*) and enter the *ipconfig* command. Check if the new IP has been accepted. If not so, repeat the configuration steps.



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Wintax- Set Session…

Make sure Wintax 4 is NOT running!!!!

Please copy the Xml files inserted into the zip to:

C:\WinTAX4 \System (accept overwriting)

Then, Open WinTAX then in the bar menu select Acquisition.

Acquisition Page 1 of 1

Acquisition

Acquisition Manager	Link to Acquisition manager component
Enable Auto Rx	Pause of *Auto Rx* functions. To disable the *Auto Rx* , please go to Acq_Manager and unchek *Auto Rx* in Rx Task menu
[Pro] [Team/User] Enable Auto Rx Remote	Pause of *Auto Rx on Remote* functions. To disable the *Auto Rx on Remote* , please go to Acq_Manager and unchek *Auto Rx on Remote* in Rx Task menu
[Pro] [Team/User] Enable Auto Rx Import Lap	Pause of *Auto Rx on Imprt Lap* functions. To disable the *Auto Rx on Imprt Lap* , please go to Acq_Manager and unchek *Auto Rx on Imprt Lap* in Rx Task menu
Update Rx	Manual Update RX
Cable/MVL Download Wizard	Cable/Marvel Download Wizard
[Pro] DST Download Wizard	DST Download Wizard
Session Startup Wizard	Session Startup Wizard

mk:@MSITStore:C:\Nanterre_2007\WinTAX\4.xx_A1GP\Docs\Wintax4.CHM::/Me... 16/09/2008

Wintax – Acquisition Manager

Everything should be set :

Event: 2011C_S13_RAL_A55R3

Session: S1-S3

Car:Click browse when you are connected to the car

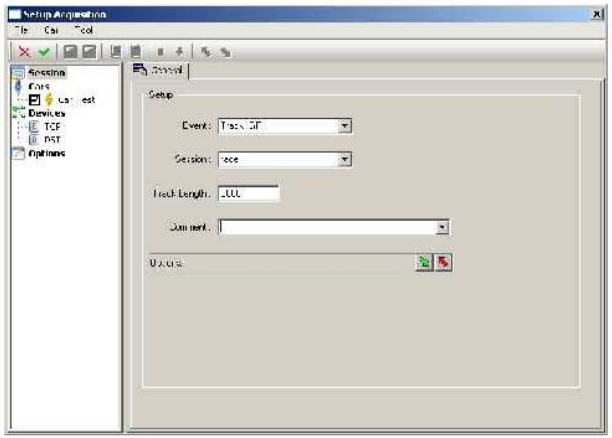
Etc…

Just confirmed this configuration.
Then go back to Acquisition Manager.

Session Startup

Before starting a working session, define the parameters used by WinTAX to organize in the archive the data acquired.

These settings are defined the **Setup Acquisition** environment, that can be reached from the *Acquisition/Setup* menu or from the *Setup Acquisition* button on the toolbar.



Commands of the window

Load	Loading of the context data (constant, user record, offset and gain) of a car
Save	saving of the context data of a car.
Add	adds a new slot car to the configuration
Remove	cancels of the slot car selecting
Move Down	moves downwards by one position the slot car selected
Move Up	moves upwards by one position the slot car selected
[Pro] Publish All Session & Car	publishes on the RTTS server the configurations

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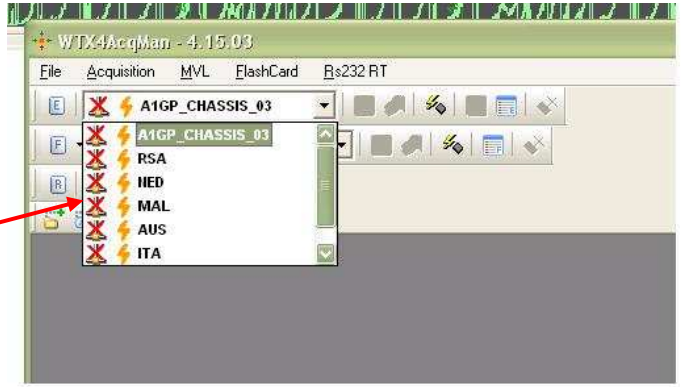
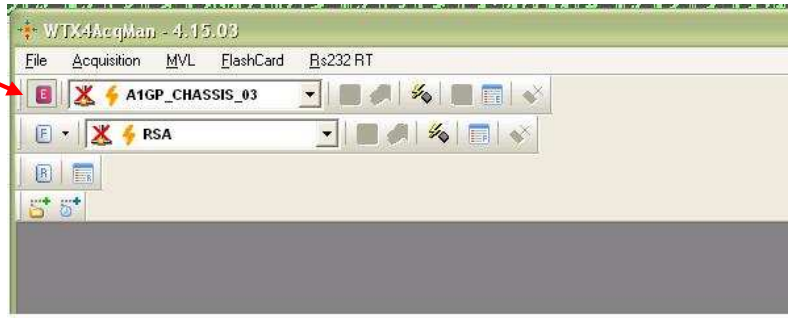
Wintax - Viewing Data

- In Acquisition Manager:
  - Select the car, you want to download.



- Click on ‘M’ button,it’s gonna turn green if you are connected to the car.



Wintax - Downloading Data

- In Acquisition Manager:
  - Icon ‘check downloaded file from MVL’ will be available, click on it. A display of all laps available into the SRT will be shown. Then select those you want to and press ‘enter’
  - If you have already downloaded some laps, you will see a check on those laps
  - Datas start to be downloaded, a progression bar is available below. When it is finished the AcqMan window is minimized.